

# **PIVOTING MECHANISM FOR A LINK ROD OF AN ELLIPTICAL EXERCISER**

## **BACKGROUND OF THE INVENTION**

### **5    1. Field of the Invention**

The present invention relates to a pivoting mechanism for a link rod of an elliptical exerciser, especially to a kind of structure that can simplify the structure, reduce the cost, is easy to maintain and stable to operate.

### **2. Description of the Related Art**

10       Referring to Fig. 6, the linking structure of a conventional elliptical exerciser includes a main body 10 on which a handle rod 12 is pivotally mounted and a crank 14. A pair of handles 13 are disposed on top of the handle rod 12 while one end of the crank 14 is connected to a sliding rod 15 with pedals 16 by a pivoting mechanism. The other end of the sliding rod 15  
15    slides along the sliding base 17 positioned on the main body 10. A driving mechanism 11 arranged on the bas 10 links to a shaft 110 with one end part connected with the crank 14. For improving the stability of sliding, Taiwan Patent No.: 362507, as shown in FIG. 7, discloses a configuration having a sleeve 30 arranged on one end of the sliding rod 15 and a sleeve pipe 31  
20    fitted therein. Each of two ends of the sleeve 30 is a flared opening whose diameter is larger than that of the sleeve pipe 31 so as to form a clearance between the sleeve 30 and the sleeve pipe 31.

Several bearings 32 are fitted inside the sleeve pipe 31 while one end of the crank 14 is movably received in the bearing 32 and fixed by a shim 33  
25    and clasps. Due to the clearance between the sleeve 30 and the sleeve pipe

31, the sliding rod 15 has certain space to roll and the stability of the sliding rod 15 sliding on the sliding base 17 is also improved. However, such design still has following disadvantages:

1. In addition to the bearing 32 and the sleeve 30, the sleeve pipe 31 is disposed inside the sleeve 30 and the shim 33 positioned on two ends of the sleeve 30. In order to form the clearance with the sleeve pipe 31, the two ends of the sleeve 30 have flared openings that are difficult to manufacture and process. Moreover, such structure is easy to be damaged, thereby having high defect rate and stress concentration.
2. Due to a plurality of components, it difficult to assemble, labor-consuming and hard to maintain.

### SUMMARY OF THE INVENTION

It is therefore a primary object of the present invention to provide a pivoting mechanism for a link rod of an elliptical exerciser that has simplified structure, low manufacturing cost, easy assembling, and convenient maintenance. The present invention has a crank with one end thereof connected to a sliding rod by a pivoting mechanism. The pivoting mechanism is composed of a sleeve with a bearing arranged inside. One end of the crank is inserted through the bearing. A projecting collar is positioned on one side of the sleeve while a mounting hole whose inner diameter is larger than the outer diameter of the projecting collar is arranged on one end of the sliding rod. The projecting collar inserts the mounting hole on the sliding rod. A pivotal rod is inserted through the sliding rod and the projecting collar so that the projecting collar can rotate with the sliding rod.

## BRIEF DESCRIPTION OF THE DRAWINGS

The accomplishment of this and other objects of the invention will become apparent from the following descriptions and its accompanying drawings of which:

5        FIG.1 is a perspective view of an elliptical exerciser in accordance with the present invention;

FIG. 2 is an enlarged view of the featured structure of the present invention;

10       FIG. 3 is a cross-sectional view of the featured structure of the present invention;

FIG. 4 is a cross-sectional view of another featured structure of the present invention;

FIG. 5 is a schematic drawing of an embodiment of the present invention wherein the projecting collar slightly rotates about the pivotal rod;

15       FIG. 6 is a lateral schematic view of a prior art of an elliptical exerciser; and

FIG. 7 is an explosive schematic view of a prior art.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

20       Refer to FIGS. 1 and 2, a pivoting mechanism for a link rod of an elliptical exerciser of the present invention is composed of a handle rod 12 and a crank 14 pivoted on a main body 10. A pair of handles 13 disposed on top of the handle rod 12 while one end of the crank 14 is connected to a sliding rod 15 with pedals 16 by a pivoting mechanism. The other end of the sliding rod 15 slides along the sliding base 17 positioned on the main body

10. A driving mechanism 11 arranged on the main body 10, together with a shaft 110 having one end part connected with the crank 14, form a link system.

5 The pivoting mechanism includes a sleeve 20 with a bearing 21 disposed inside. One end of the crank 14 is inserted and positioned inside the bearing 21 while a projecting collar 200 projects outwardly from one side of the sleeve 20. A mounting hole 150 whose inner diameter is larger than the outer diameter of the projecting collar 200 is disposed on one end of the sliding rod 15. Thus the projecting collar 200 is inserted into the  
10 mounting hole 150 of the sliding rod 15 with a clearance 151 between the projecting collar 200 and the inner wall of the sliding rod 15. A pivotal rod 22 is inserted through the sliding rod 15 and the projecting collar 200 so as to allow the sleeve 20 and the projecting collar 200 to rotate with the sliding rod 15.

15 Referring to FIG. 4, an embodiment of the present invention is shown. A plurality of elastic strips 23 are positioned on the inner wall of the sliding rod 15 for cushioning and avoiding the collision when the projecting collar 200 is moved with the sliding rod 15.

20 Besides, the mounting hole 150 of the sliding rod 15 has an elliptic cross-section.

For a further embodiment of the present invention, the cross-section of the mounting hole 150 of the sliding rod 15 is orthogonal.

Furthermore, referring to FIG. 5, the two sides of the projecting collar 201 on the sleeve 20 can be designed to a curved surface 202 such that the  
25 projecting collar is slightly rotatable about the pivotal rod 22. Thus, the

sleeve 20 and the projecting collar 201 can more smoothly move with the sliding rod 15 with minimized friction.

Referring to FIGS. 2 through 4, when operated, the sliding rod 15 moves elliptically by the crank 14. Due to the clearance 151 between the projecting collar 200 of the sleeve 20 and the inner wall with the mounting hole 150 of the sliding rod 15, both of the projecting collar 200 and the sliding rod 15 can slightly rotate about pivotal rod 22. Accordingly, less obstructive effect is created between the crank 14 and the sliding rod 15 and the stability of the sliding rod 15 on the sliding base 17 is improved.

10 The present invention has the following advantages:

1. In addition to the improvement of the stability of the sliding rod on the main body, it's not required to change the specification of the sleeve, the bearing and the crank of the present invention. It is only required to fit the projecting collar into the mounting hole of the sliding rod in a manner that a proper clearance therebetween is reserved. Moreover, the elliptic mounting hole of the sliding rod is easy to manufacture and process so that the cost is minimized.
2. The number of the components is less than traditional structure. The structure is also more simplified and easy to maintain.

20 Many changes and modifications in the above-described embodiments of the invention can, of course, be carried out without departing from the scope thereof. Accordingly, to promote the progress in science and the useful arts, the invention is disclosed and is intended to be limited only by the scope of the appended claims.

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